

RECEIVED
CENTRAL FAX CENTER

JUL 18 2005

HEWLETT-PACKARD COMPANY
 Intellectual Property Administration
 P. O. Box 272400
 Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 200302181-1

IN THE
 UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Reuter

Confirmation No.: 4878

Application No.: 09/872,962

Examiner: Nguyen, Trong

Filing Date: 06/01/2001

Group Art Unit: 2152

Title: CENTRALIZED FINE-GRAINED ENHANCEMENTS FOR DISTRIBUTED TABLE DRIVEN I/O MAPPING

Mail Stop Appeal Brief-Patents
 Commissioner For Patents
 PO Box 1450
 Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 7/6/2005.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

() (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

() one month	\$120.00
() two months	\$450.00
() three months	\$1020.00
() four months	\$1590.00

() The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$500.00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

() I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450. Date of Deposit: _____

OR

(X) I hereby certify that this paper is being transmitted to the Patent and Trademark Office facsimile number (703) 872-9306 on 7/18/2005.

Number of pages: 21

Typed Name: Jed Caven

Signature: [Signature]

Rev. 12/04 (Apbriet)

Respectfully submitted,

Reuter

By [Signature]

Jed Caven

Attorney/Agent for Applicant(s)

Reg. No. 40,551

Date: 7/18/2005

Telephone No.: (720) 841-9544

RECEIVED
OIPE/AP

JUL 19 2005

**RECEIVED
CENTRAL FAX CENTER**

JUL 18 2005

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:)	
)	
James Reuter)	Group Art Unit: 2152
)	
Serial No.: 09/872,962)	Examiner: Nguyen, Trong Nhan
)	
Filing Date: June 1, 2001)	Confirmation No.: 4878
)	
For: CENTRALIZED FINE-GRAINED ENHANCEMENTS FOR DISTRIBUTED TABLE DRIVEN I/O MAPPING		

APPEAL BRIEF

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in response to the final rejections of the claims mailed April 26, 2005. A Notice of Appeal was filed on July 6, 2005.

REAL PARTY IN INTEREST

The assignee of the entire right, title, and interest in the patent application is Hewlett-Packard Development Company.

07/19/2005 EAREGAY1 00000064 082025 09872962

01 FC:1402 500.00 DA

RELATED APPEALS AND INTERFERENCES

There are currently no related appeals of other United States patent applications known to Appellants, Appellants' legal representative, or the assignee that will directly affect, or be directly affected by, or have a bearing on, the Board's decision. There are currently no related interferences known to Appellants, Appellants' legal representative, or the assignee which will directly affect, or be directly affected by, or have a bearing on, the Board's decision.

STATUS OF CLAIMS

Claims 1-16 are pending in the application. In the final Office Action mailed April 26, 2005, claims 1-16 were finally rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,260,120 to Blumenau ("Blumenau").

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The subject matter of the independent claims is summarized below with reference numerals and reference to the specification and drawings in accordance with 37 CFR §41.37.

Claim 1

Claim 1 is directed to a virtual storage system (page 4, lines 3-4; reference numeral 100) for mapping virtual storage segments of differing sizes to storage locations. The system comprises:

an agent (page 4, line 28 – page 6, line 13; reference numeral 110) coupled to the host (page 4, line 5; reference numeral 140), the agent (110) having volatile memory for storing a first table (page 5, line 4; reference numeral 200), the table having entries to map the virtual storage segments to the storage locations; and

a controller (page 5, lines 20-31; reference numeral 120) coupled to the agent, the controller having non-volatile memory for storing a second table (page 5, lines 20-31; reference numeral 201), the controller intermittently causing contents of the first table to be replaced by contents of the second table,

whereby during an input/output (I/O) operation, the host accesses one of the entries in the first table to determine one of the storage locations.

Claim 7

Claim 7 is directed to a system (page 4, lines 3-4; reference numeral 100) for mapping a virtual disk segment to a storage location within a storage device (page 4, lines 10-15; reference numeral 160), such that a host queries said system to determine said storage location for input/output operations, said system comprising:

a first table (page 5, line 4; reference numeral 200) having a first table entry (page 7, lines 11-20; reference numeral 210) mapping the virtual disk segment to the storage location;

a second table (page 5, lines 20-31; reference numeral 201) having a second table entry (page 7, lines 11-20; reference numeral 210) corresponding to said storage location and to an alternate storage location, and block bitmap information identifying blocks of data having differing sizes within the alternate storage location (page 7, lines 11-29; reference numeral 225);

a plurality of variables indicating states of the entry (page 7, lines 11-29; reference numeral 225);

an offset for the entry, wherein the offset includes a logic unit number identifier and a block identifier (page 7, lines 9-10; reference numeral 234; page 11, lines 5-10; reference numeral 238);

a first memory (page 5, lines 8-12) to store the first table; and

a second memory (page 5, lines 25-30) to store the second table.

Claim 12

Claim 12 is directed to a method for performing an input/output operation on a virtual storage segment defined by a first table (page 5, line 4; reference numeral 200) that maps the storage segment to a first storage location, the method comprising:

turning off input/output operations at the first storage location (page 14, line 12 – page 15, line 15);

identifying portions of the virtual storage segment to be effected during the write operation (page 16, lines 3-29);

storing a record of the identified portions at a second table and not at the first table (page 16, lines 3-29); and

writing to a second storage location, whereby the writing operation occurs at portions of the second storage location associated with the identified portions (page 16, lines 3-29).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1-16 are obvious under 35 U.S.C. § 103(a) in view of U.S. Patent No. 6,260,120 to Blumenau ("Blumenau").

ARGUMENT

I. Rejections Under 35 U.S.C. §103

Claims 1-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,260,120 to Blumenau (hereinafter, "Blumenau"). These rejections are traversed based on the following arguments.

A. Claim 1

Claim 1 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, the Examiner must establish that each element of the claim is disclosed or suggested by the cited references. *See*, MPEP 2142.

Independent **claim 1** includes a limitation requiring "an agent coupled to the host, the agent having volatile memory for storing a first table, the table having entries to map the virtual storage segments to the storage locations." The final Action asserts that Blumenau discloses this limitation, and cites Fig. 30 and col. 8, lines 56-62, col. 30, lines 53-55 and col. 32 lines 43-55 to support the assertion. Applicants disagree. A close inspection of Blumenau reveals that Fig. 30 is a GUI display that maps a relationship between logical storage volumes on the storage subsystem and the volumes addressed by the host. Fig. 30 neither discloses nor suggests a table having entries to map virtual disk positions to locations on storage devices, as recited in claim 1. As to the cited text:

Col. 8, lines 56-62 reads as follows:

One of the storage adapters 37, 38 responds to the storage access request by performing a logical-to-physical translation to determine where the data to be accessed resides on the storage devices, and reads the data from the storage

devices and writes the data to the cache memory, for access by the port adapter.

Col. 30, lines 30-55 reads as follows:

In this example, the GUI display screen includes, on the left, a list 346 in outline form of storage subsystem components down to a set of logical volumes for one virtual port, and on the right, a list 347 in outline form of host components down to a set of LUNs as addressed from one host controller port.

Col. 32, lines 45-45 reads as follows:

A primary copy of the configuration information for the volumes accessible to a host is kept in the storage subsystem and on the host.

Contrary to the assertion in the action, nothing in the text cited in the final Action discloses or suggests *an agent coupled to the host, the agent having volatile memory for storing a first table, the table having entries to map the virtual storage segments to the storage locations*, as recited in claim 1.

Claim 1 further recites a limitation requiring “a controller coupled to the agent, the controller having non-volatile memory for storing a second table, the controller intermittently causing contents of the first table to be replaced by contents of the second table.” The final Action asserts that Blumenau discloses this limitation, and cites Figs. 4-5 and col. 8, lines 56-62, col. 25 lines 1-7, and column 32, lines 45-47 to support the assertion. Applicants disagree.

Col. 8, lines 56-62 reads as follows:

One of the storage adapters 37, 38 responds to the storage access request by performing a logical-to-physical translation to determine where the data to be accessed resides on the storage devices, and reads the data from the storage devices and writes the data to the cache memory, for access by the port adapter.

Col. 25, lines 1-7 reads as follows:

This assignment information must also be used by the host if the host has an operating system that permits the host to boot from a logical volume in storage linked by the Fibre Channel network to the host, or that permits the operating system of the host to collect information about the logical storage volumes that it can access. In other words, the operating system routine that searches for the storage volumes that are accessible to the host must send Report LUNs commands to only the virtual ports assigned to the host and not to the virtual ports assigned to other hosts.

Col. 32, lines 45-47 reads as follows:

The host should be able to access the primary copy on the storage subsystem if a host's local copy is not available.

Nothing in this text discloses or suggests *a storage controller that includes a controller coupled to the agent, the controller having non-volatile memory for storing a second table, the controller intermittently causing contents of the first table to be replaced by contents of the second table*, as recited in the claim.

Claim 1 further recites a limitation that "whereby during an input/output (I/O) operation, the host accesses one of the entries in the first table to determine one of the storage locations." The Action asserts that Blumenau discloses this limitation, and cites col. 32 lines 45-47 to support the assertion. Applicants disagree.

The cited text reads as follows:

The host should be able to access the primary copy on the storage subsystem if a host's local copy is not available.

Nothing in this text discloses or suggests an arrangement in which a host accesses one of the entries in the table stored on the agent to determine one of the storage device locations, as recited in claim 1.

In the Advisory Action, it appears the Examiner cited column 44, lines 48-51 and 55-64 to support the assertion that Blumenau discloses this limitation. Applicants disagree. The

cited text reads as follows:

2. It is desirable to have a partitioning feature that will define the set of volumes that can be seen by a single host. This will restrict other hosts from seeing volumes they are not configured to see.
4. It is desirable to have a mapping feature that will allow the host to specify its own LUN, which would be mapped to a logical LUN within the storage subsystem.
5. It is desirable to have the capability of selecting between "simultaneous multi host access" to a volume, and a "single host access" at a time. This is to control data sharing capabilities.
6. It is desirable to limit host-to-volume access to read-only or read/write..

Contrary to the assertion in the action, nothing in the text cited in the Advisory Action discloses or suggests *an agent coupled to the host, the agent having volatile memory for storing a first table, the table having entries to map the virtual storage segments to the storage locations*, as recited in claim 1.

In sum, contrary to the assertion in the Action, Blumenau neither discloses nor suggests the limitations of independent claim 1. Accordingly, Blumenau cannot render obvious independent claim 1.

B. Claims 2-3

Claim 2 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

Claim 2 includes a limitation reciting "the second storage table identifies an alternate storage location within the storage location." The rejection in the final Action states only that "Claims 2, 4, 5, 8, and 9 are rejected for the same reasons as claim 1 addressed above." The Action provides no factual basis whatsoever to establish that each element of claim 2 is disclosed or suggested by the cited references. Hence, the Action fails to establish a *prima facie* case of obviousness.

Claim 3 depends from claim 2, and hence incorporates the limitations of claim 2. Hence, the final Action fails to establish a *prima facie* case of obviousness of claim 3.

C. Claims 4-6

Claim 4 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

Claim 4 includes a limitation requiring "an alternate storage container comprising alternate storage locations of the storage location correlating to the virtual storage segments." The rejection in the final Action states only that "Claims 2, 4, 5, 8, and 9 are rejected for the same reasons as claim 1 addressed above." The Action provides no factual basis whatsoever to establish that each element of claim 4 is disclosed or suggested by the cited references. Hence, the Action fails to establish a *prima facie* case of obviousness.

Claims 5-6 depends from claim 4. Hence, the final Action fails to establish a *prima facie* case of obviousness of claim 3.

Claim 7

Claim 7 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, the Action must establish that each element of the claim is disclosed or suggested by the cited references. *See*, MPEP 2142. Independent claim 7 includes limitations reciting "a first table having a first table entry mapping the virtual disk segment to the storage location" and "a second table having a second table entry corresponding to said storage location and to an alternate storage location, and block bitmap information identifying blocks of data having differing sizes within the alternate storage location." The final Action asserts that Blumenau discloses these limitations, and appears to cite the text at column 8, lines 56-62 to support the rejection. This text is excerpted above in the arguments in support of claim 1. Nothing in Fig. 23 discloses or suggests *first and second tables* as recited in claim 7.

Independent claim 7 includes a limitation requiring "a plurality of variables indicating states of the entry." The Action asserts that Blumenau discloses this limitation, and cites Fig. 23 and col. 26, lines 36-40. Applicants disagree. Nothing in Fig. 23 discloses or suggests *a plurality of variables indicating states of the entry*.

Col. 26, lines 36-40 reads as follows:

Separate tables are used because each host listed in the host table can have more than one assigned virtual port. Also included in the volume access and mapping information 269 are optional lists 283 of indices to the virtual port identifiers in the virtual port mapping table 282 assigned to each host in the virtual port host table 281.

Contrary to the assertion in the action, nothing in the text discloses or suggests *a plurality of variables indicating states of the entry*, as recited in claim 7.

In the Advisory Action the Examiner asserted, *for the first time during prosecution of this application*, that “Examiner interprets ‘plurality of variables indicating states of the entry’ to mean that various states of the table entry mapping; i.e., the host identifies the data block that is mapped to a storage location on the storage device.” It is unclear to the undersigned attorney precisely what the Examiner’s statements are intended to convey. In any event, nothing in Fig. 23 or the accompanying text discloses or suggests *a plurality of variables indicating states of the entry*, as recited in claim 7.

In sum, contrary to the assertion in the Action, Blumenau neither discloses nor suggests the limitations of independent claim 7. Accordingly, Blumenau cannot render obvious independent claim 7.

Claims 8-9

Claims 8-9 stands rejected over the ‘120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

Claim 8 includes a limitation requiring “said first memory is a volatile memory.” Claim 9 includes a limitation requiring “said second memory is a non-volatile memory.” The rejection in the final Action states only that “Claims 2, 4, 5, 8, and 9 are rejected for the same reasons as claim 1 addressed above.” The Action provides no factual basis whatsoever to establish that each element of claims 8-9 are disclosed or suggested by the cited references. Hence, the Action fails to establish a *prima facie* case of obviousness.

Claim 12

Claim 12 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, the Action must establish that each element of the claim is disclosed or suggested by the cited references. *See*, MPEP 2142. Independent **claim 12** includes a limitation requiring "turning off input/output operations at the first storage location." The Action asserts that Blumenau discloses this limitation, and cites col. 9 lines 16-19. Applicants disagree.

Col. 9, lines 16-19 reads as follows:

Mirroring or RAID (redundant array of inexpensive disks) techniques ensure that the storage adapters 37, 38 can recover data in the event of failure of any one of the storage devices.

Contrary to the assertion in the action, nothing in the text discloses or suggests *turning off input/output operations at the first storage location*, as recited in claim 12.

Claim 13

Claims 13 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

Claim 13 includes a limitation requiring "the turning off step includes activating an invalid state." The rejection in the final Action states only that "Claim 13 is rejected for the same reasons as claim 12 above." The Action provides no factual basis whatsoever to establish that each element of claim 13 is disclosed or suggested by the cited references. Hence, the Action fails to establish a *prima facie* case of obviousness.

Claims 15-16

Claims 15-16 stands rejected over the '120 patent. Applicants traverse this rejection, and assert that the final Action fails to establish a *prima facie* case of obviousness.

Claim 15 includes a limitation requiring "the first table is stored by an agent and during the read operation, the record of the identified portions is sent to the agent." Claim 16 includes a limitation requiring "the mapping between the virtual storage segment and first storage location is contained in numerous first tables, each of the first table stored by a different agent." The rejection in the final Action states only that "Claims 15-16 are rejected on the same basis as claim 1 addressed above." The Action provides no factual basis whatsoever to establish that each element of claims 15-16 are disclosed or suggested by the cited references. Hence, the Action fails to establish a *prima facie* case of obviousness.

CONCLUSIONS

The '120 patent fails to disclose or suggest limitations of appellants' claims. Therefore, the '120 patent cannot be used to establish the required *prima-facie* case of obviousness under 35 U.S.C. §103. Appellants urge the Board to reverse the examiner's rejections under 35 U.S.C. §103 of claims 1-16.

Respectfully submitted,

Jed W. Caven
Caven & Aghevli LLC
Attorney for Applicants

A handwritten signature in black ink, appearing to read 'Jed W. Caven', with a stylized, cursive script.

By:
Jed W. Caven
Registration No. 40,551
(720) 841-9544

Date: July 18, 2005

APPENDIX A**Claims**

1. A virtual storage system for mapping virtual storage segments of differing sizes to storage locations, comprising:

an agent coupled to the host, the agent having volatile memory for storing a first table, the table having entries to map the virtual storage segments to the storage locations; and

a controller coupled to the agent, the controller having non-volatile memory for storing a second table, the controller intermittently causing contents of the first table to be replaced by contents of the second table,

whereby during an input/output (I/O) operation, the host accesses one of the entries in the first table to determine one of the storage locations.

2. The system of claim 1, wherein the second table identifies an alternate storage location within the storage locations.

3. The system of claim 2, wherein the second table further includes a bitmap that having entries that correspond to blocks of data stored within the alternate storage location.

4. The system of claim 1, further comprising an alternate storage container comprising alternate storage locations of the storage location correlating to the virtual storage segments.

5. The system of claim 4, wherein an I/O operation accesses information on both the storage location and the alternative storage location.

6. The system of claim 5 wherein a bitmap designates blocks at the alternative storage

location to use for the I/O operation.

7. A system for mapping a virtual disk segment to a storage location within a storage device, such that a host queries said system to determine said storage location for input/output operations, said system comprising:

a first table having a first table entry mapping the virtual disk segment to the storage location;

a second table having a second table entry corresponding to said storage location and to an alternate storage location, and block bitmap information identifying blocks of data having differing sizes within the alternate storage location;

a plurality of variables indicating states of the entry;

an offset for the entry, wherein the offset includes a logic unit number identifier and a block identifier;

a first memory to store the first table and

a second memory to store the second table.

8. The system of claim 7, wherein said first memory is a volatile memory.

9. The system of claim 7, wherein said second memory is a non-volatile memory.

10. The system of claim 7, wherein the states include a no-write state.

11. The system of claim 7, wherein the states include an error state.

12. A method for performing an input/output operation on a virtual storage segment defined by a first table that maps the storage segment to a first storage location, the method comprising:
- turning off input/output operations at the first storage location;
 - identifying portions of the virtual storage segment to be effected during the write operation;
 - storing a record of the identified portions at a second table and not at the first table; and
 - writing to a second storage location, whereby the writing operation occurs at portions of the second storage location associated with the identified portions.
13. The method of claim 12, wherein the turning off step includes activating an invalid state.
14. The method of claim 12, wherein a subsequent read operation for the virtual segment occur at portions of the first storage location not included in the identified portions and the portions of the second storage location associated with the identified portions.
15. The method of claim 14, wherein the first table is stored by an agent and during the read operation, the record of the identified portions is sent to the agent.
16. The method of claim 15, wherein the mapping between the virtual storage segment and first storage location is contained in numerous first tables, each of the first table stored by a different agent.